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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

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## (PCT Article 36 and Rule 70)

Applicant's or agent's file reference 116171-00012	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/US03/20770	International filing date (day/month/year) 01 July 2003 (01.07.2003)	Priority date (day/month/year) 01 July 2002 (01.07.2002)
International Patent Classification (IPC) or national classification and IPC IPC(7): B05D 3/02 and US Cl.: 427/229, 374.1, 383.1, 383.7, 377, 398.1; 428/681; 429/166		
Applicant THOMAS STEEL STRIP		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of <u>5</u> sheets, including this cover sheet.
<input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT). These annexes consist of a total of <u>2</u> sheets.
3. This report contains indications relating to the following items:
<ul style="list-style-type: none"> <li>I <input checked="" type="checkbox"/> Basis of the report</li> <li>II <input type="checkbox"/> Priority</li> <li>III <input type="checkbox"/> Non-establishment of report with regard to novelty, inventive step and industrial applicability</li> <li>IV <input type="checkbox"/> Lack of unity of invention</li> <li>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li>VI <input type="checkbox"/> Certain documents cited</li> <li>VII <input type="checkbox"/> Certain defects in the international application</li> <li>VIII <input type="checkbox"/> Certain observations on the international application</li> </ul>

Date of submission of the demand 30 January 2004 (30.01.2004)	Date of completion of this report 23 July 2004 (23.07.2004)
Name and mailing address of the IPEA/US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Authorized officer Shrive Beck Jean Proctor Paralegal Supervisor Telephone No. (571) 272-1700

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US03/20770

## I. Basis of the report

## 1. With regard to the elements of the international application:\*

 the international application as originally filed. the description:

pages 1-11 as originally filed

pages NONE, filed with the demandpages NONE, filed with the letter of \_\_\_\_\_ the claims:

pages 12, as originally filed

pages NONE, as amended (together with any statement) under Article 19pages NONE, filed with the demandpages 13 and 14, filed with the letter of 06 July 2004 (06.07.2004) the drawings:pages NONE, as originally filedpages NONE, filed with the demandpages NONE, filed with the letter of \_\_\_\_\_ the sequence listing part of the description:pages NONE, as originally filedpages NONE, filed with the demandpages NONE, filed with the letter of \_\_\_\_\_

## 2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language \_\_\_\_\_ which is:

 the language of a translation furnished for the purposes of international search (under Rule 23.1(b)). the language of publication of the international application (under Rule 48.3(b)). the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

## 3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

 contained in the international application in printed form. filed together with the international application in computer readable form. furnished subsequently to this Authority in written form. furnished subsequently to this Authority in computer readable form. The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished. The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.4.  The amendments have resulted in the cancellation of: the description, pages NONE the claims, Nos. NONE the drawings, sheets/fig NONE5.  This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\*

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

\*\* Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

**INTERNATIONAL PRELIMINARY EXAMINATION REPORT**International application No.  
PCT/US03/20770**V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. STATEMENT**

Novelty (N)	Claims <u>1-19</u>	YES
	Claims <u>NONE</u>	NO
Inventive Step (IS)	Claims <u>NONE</u>	YES
	Claims <u>1-19</u>	NO
Industrial Applicability (IA)	Claims <u>1-19</u>	YES
	Claims <u>NONE</u>	NO

**2. CITATIONS AND EXPLANATIONS**

Please See Continuation Sheet

**INTERNATIONAL PRELIMINARY EXAMINATION REPORT**International application No.  
PCT/US03/20770**Supplemental Box**  
(To be used when the space in any of the preceding boxes is not sufficient)**V. 2. Citations and Explanations:**

Claims 16-19 lack an inventive step under PCT Article 33(3) as being obvious over Lake. Lake teaches a battery can of an alkaline cell, where the can is made of stainless steel and is plated with nickel (col. 3 lines 23-55). Although, Lake does not teach the claimed method of forming the claimed article, the article produced by Lake is substantially equivalent to that produced by the claimed method. However, Lake remains silent on the limitations of measured resistance. To vary resistance is well known in the art in the battery art with the expectation of obtaining different outputs.

Claims 1, 3-5, 8, 10-12, and 15-16 lack an inventive step under PCT Article 33(3) as being obvious over Asano et al. Asano et al. teaches cleaning a steel substrate, dissolving a nickel salt, such as nickel acetate, chromium ions, and cobalt ions in an aqueous solution, applying the solution to the substrate, drying the substrate, then heating between 200-750 °C in a reducing atmosphere to reduce the nickel in the applied solution and thus depositing the nickel on the steel substrate, wherein the reducing atmosphere is a mixture nitrogen and hydrogen (Col. 2, line 24-Col. 3, line 48). Asano et al. does not teach cooling the plating substrate prior to removing from the reducing atmosphere. However, the heated substrate would inherently need to be cooled prior to subsequent use and one skilled in the would recognize that a heated nickel surface exposed to the environment (i.e. air) would more readily oxidize than a cool nickel surface. Therefore, it would have been obvious to one skilled in the art to cool the nickel plated steel, of Asano et al., while still in the reducing environment, in order to prevent undesired oxidation by exposure to air while still in a heated condition. Asano et al. does not specifically teach forming the plated steel into a useful article. However, it would have been obvious to one skilled in the art to form the plated steel into any article of desired use requiring nickel plated steel. Such a modification to Asano et al. is not inventive.

Claim 2 lacks an inventive step under PCT Article 33(3) as being obvious over Asano et al., as applied above and further in view of Tentarelli et al. Asano et al. does not teach the claimed concentrations of nitrogen and hydrogen in the reducing atmosphere. Asano et al. is silent as to the desired concentrations of nitrogen and hydrogen. Therefore, it would have been obvious to one skilled in the art to use a known and conventional reducing mixture of nitrogen and hydrogen in Asano et al. with the expectation of providing the desired reducing atmosphere. Tentarelli et al. teaches a heat treating metal in a reducing atmosphere, where the mixture of nitrogen and hydrogen is 95% nitrogen and 5% hydrogen (Col. 5, lines 4-7). It would have been obvious to one skilled in the art to use a reducing atmosphere concentration of 95% nitrogen and 5% hydrogen, in Asano et al., with the expectation of providing the desired reducing atmosphere, since it is shown by Tentarelli et al. that such nitrogen and hydrogen concentrations are known and conventional for reducing atmospheres.

Claims 6-7 and 9 lack an inventive step under PCT Article 33(3) as being obvious over Asano et al., as applied above and further in view of Newman et al. Asano et al. does not teach that the solvent used in the nickel salt solution is organic. Newman et al. teaches plating nickel onto a substrate by thermal reduction, where the plating solution is nickel acetate dissolved in methanol or water (Col. 2, lines 36-42). The teaching of Newman et al. shows that methanol and water are functional equivalents as solvents for nickel acetate salt for a nickel plating solution. Therefore, it would have been an obvious modification to the plating solution of

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(To be used when the space in any of the preceding boxes is not sufficient)

Asano et al. to use methanol as the solvent, instead of water, with the expectation of providing the desired nickel plating solution, since it is shown by the similar process and solution of Newman et al. that methanol and water are functional equivalents as solvents for the nickel acetate.

Claims 13-14 lack an inventive step under PCT Article 33(3) as being obvious over Asano et al., as applied above and further in view of Lake. Asano et al. does not teach that the steel substrate is stainless steel. Lake is applied here for the same reasons as given above. It would have been obvious to one skilled in the art to use stainless steel as the form of steel in Asano et al., with the expectation of providing the desired nickel plating steel, since it is shown by Lake that plating nickel on stainless steel is known and convention in the art and thus is not considered inventive.

Applicant first argues that the Asano fails to teach cooling a plated substrate prior to removing it from a reducing atmosphere and thus Asano would form metal oxides.

The examiner agrees in part. However, the claims as presently written do not preclude the formation of metal oxides. In addition, applicant has not established that the formation of metal oxides is due solely to the cooling step.

Claims 1-19 meet the criteria set out in PCT Article 33(2), because the prior art does not specifically teach the claimed process of plating the metal substrate, specifically the claimed cooling step.

Claims 1-19 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.

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— NEW CITATIONS —

9. The method of claim 6, wherein the salt of each at least one first metal is soluble in the organic liquid.

10. The method of claim 8 or 9, wherein the salt has anions that are selected from the group comprising oxygen, hydrogen, nitrogen, carbon and combinations thereof.

11. The method of claim 10, wherein the salt of each at least one first metal is selected from the group consisting of hydroxides, oxides, oxalates, carbonates, bicarbonates, citrates, cyanides, formates, acetates, nitrates and nitrites.

12. The method of claim 1, wherein the second metal substrate is formed into a useful article before the coating step and the thermal reduction step accomplishes a heat-treating step that is otherwise required for the useful article.

13. The method of claim 1, wherein the second metal is a stainless steel.

14. The method of claim 13, wherein the at least one first metal is selected from a group consisting of nickel, cobalt and combinations thereof.

15. The method of claim 1, wherein the at least one first metal is selected from a group consisting of chromium, molybdenum, tungsten, vanadium, niobium, tantalum, titanium, zirconium, boron, aluminum, gallium, silicon, germanium and phosphorus.

16. A steel strip produced by the method of claim 14.

17. A battery can produced from the steel strip of claim 16.

18. A battery can produced by the method of claim 12, wherein the second metal is a stainless steel and the at least one first metal is selected from the group consisting of nickel, cobalt and combinations thereof.

19. An alkaline cell comprising a battery can of claim 17 or 18.